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August 25, 2003

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Ms. Marlene Dortch, Secretary
Federal Communications Commission
445 Twelfth St., S.W., TW-A325
Washington, D.C. 20554

Re: WT Docket No. 03-66
Notice of Oral Ex Parte Communication

Dear Secretary Dortch:

On August 25th, 2003, ArrayComm, Inc. ("ArrayComm") through its representatives Joanne Wilson and Leonard Kolsky met with Bruce Franca, Julius Knapp and Ira Keltz of the Office of Engineering & Technology ("OET") of the Federal Communications Commission.

ArrayComm discussed some of the 2500-2690 MHz band plans proposed by the Wireless Coalition Association and others. ArrayComm offered its own plan, which it believes is in harmony with the Commission's objectives, minimizes coexistence problems and maximizes spectrum utilization. Its presentation was in written form and copies were distributed to the attendees.

Pursuant to Section 1.1206(b) of the Commission's Rules and regulations, 47 C.F.R. §1.1206(b), two copies of the presentation referenced herein are included.

Respectfully submitted,

Leonard S Kolsky

Leonard S. Kolsky
Counsel for ArrayComm, Inc.

CC: Bruce Franca, Julius Knapp, Ira Keltz

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Analysis of 2.5 GHz Band Plan Proposals

Joanne C. Wilson
ArrayComm, Inc
August 25, 2003.

Analysis of 2.5 GHz Band Plan Proposals

Agenda

- **Preliminary Views and Concerns**
- **Elements of Ideal Band Plans**
- **WCA Proposal**
  - Review
  - Pros and Cons
- **Alternative Proposals to the WCA TRRG**
  - Nokia Plan and analysis
  - Clearwire Plan and analysis
- **"*Flexibility with Order*" Proposal**
- **European Version of "*Flexibility with Order*" Proposal**
  - Similarities and differences
- **Conclusions**

Analysis of 2.5 GHz Band Plan Proposals

Preliminary Views and Concerns

- **The 2.5 GHz 3G band is the last best opportunity for allocation that is harmonized between the US and Europe**
- **The WCA Proposal has some merits and some significant weaknesses**
- **Alternative proposals have some merits and weaknesses, too.**
- **There may be an approach that addresses the weaknesses of the WCA proposal, provides desired flexibility and could be harmonized with Europe**
- **Adopting a US allocation that ignores European interests dooms future harmonization efforts**

Analysis of 2.5 GHz Band Plan Proposals

Elements of Ideal Band Plans

- **Key elements are Common in US and European markets**
  - Paired Spectrum w/ appropriate duplexer spacing for FDD systems
  - Common band gap
  - Common duplexer spacing
- **Provides spectrum for both TDD and FDD systems**
- **Supports coexistence**
  - Minimizes guard bands
- **Maximizes spectrum utilization**
- **Provides sufficient flexibility so that technology choice is market-driven**
  - US requirement only

Analysis of 2.5 GHz Band Plan Proposals

WCA Proposal

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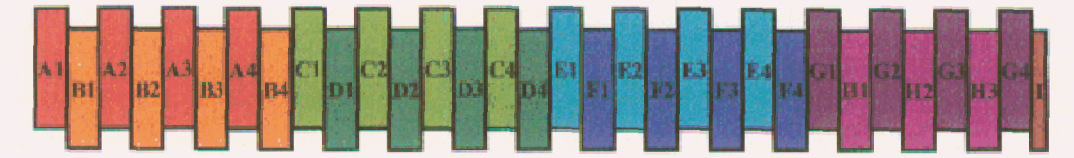
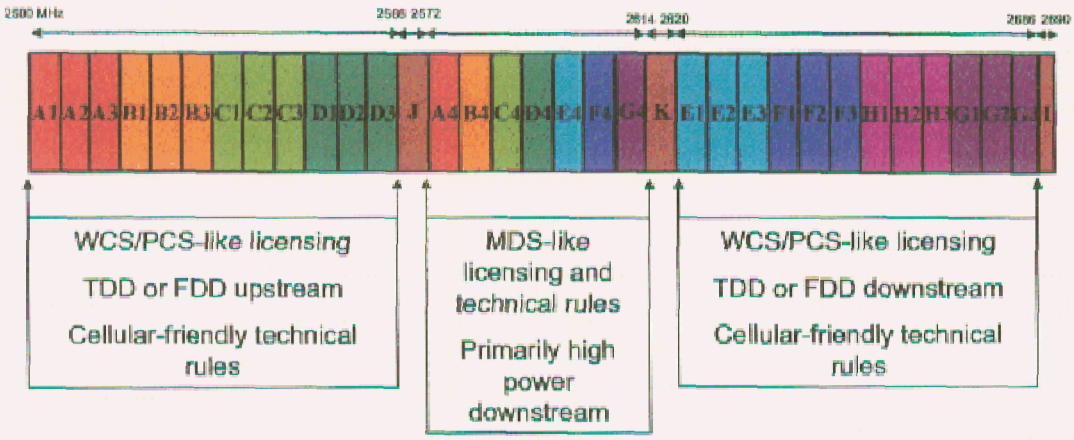
The Fundamental Problems

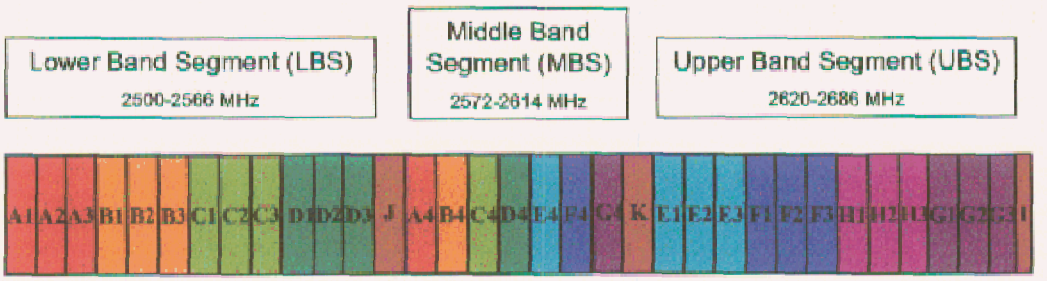
- First generation of data services suffered from line-of-sight and professional installation requirements.
- Marketplace demand is evolving towards portable and mobile devices.
  - FCC changed MDS/ITFS allocation to permit non-fixed uses in 2001.
- Current regulatory structure does not accommodate next generation portable and mobile devices that can be self-installed and do not require line-of-sight.

The Old and New Bandplans





The Proposed New National Bandplan



LBS and UBS are each 66 MHz wide, broken into twelve 5.5 MHz channels.

Deinterleaving results in contiguous LBS/UBS blocks of 16.5 MHz.

MBS is 42 MHz wide, broken into seven 6 MHz channels, one for each current 4 channel group.

J and K Bands are each 6 MHz wide, each broken into twelve 500 kHz channels (1 channel per 5.5 MHz LBS/UBS channel).

I Band provides a 125 kHz channel for each LBS, MBS and UBS channel.

MBS plus J and K Bands provide 54 MHz duplex separation for FDD services.

MBS stays "on channel" relative to current bandplan to reduce transition costs.

The Critical Components Of The WCA/NIA/CTN Proposal

- High-power, high-site operations will be restricted to MBS.
- "Proponent" will migrate ITFS high-power, high-site operations to MBS and provide eligible ITFS receive sites with new downconverters that will be immune to BFO from LBS/UBS operations.
- Operations in the LBS/UBS will be freed from overly-conservative interference protection rules.
  - ITFS receive sites will be protected by virtue of new downconverters and J and K Transition Bands.
  - LBS/UBS will be regulated by WCS/PCS model – Applications replaced by enforcement of technical rules
- Cellular operations in LBS/UBS will not be vulnerable to interference from high-power, high-site operations.

The Critical Components Of The WCA/NIA/CTN Proposal

- Different technical rules (spectral mask, field strength limits at border, etc.) proposed for different segments to reflect different needs.
- Subchannelization and superchannelization continue to be permitted.
- Professional installation requirement eliminated for CPE at or below +18 dBW EIRP
- Restrictions on omnidirectional antennas repealed.
- MBS channels can migrate to LBS/UBS rules upon consent of affected MBS licensees.
- BTA auctions to license ITFS "white space."
- Exclusive GSAs will be established.
  - Based on current BTA/PSA, but "no man's land" created by overlapping PSAs will be eliminated by "splitting the football."

Analysis of 2.5 GHz Band Plan Proposals

Assessment of WCA Proposal

+ Large amount of industry support
+ Provides paired spectrum suitable for FDD systems
+ Provides spectrum for either TDD or FDD systems
+ Technology choice is market-driven
- Coexistence challenges pushed to the deployment phase => additional cost, complexity and time
- Large amounts of spectrum could be wasted in internal guard bands
- No assurance that "pairable" spectrum for FDD systems remains available during the reassignment process
- Provides "flexibility with chaos" which won't be attractive in other markets, particularly Europe

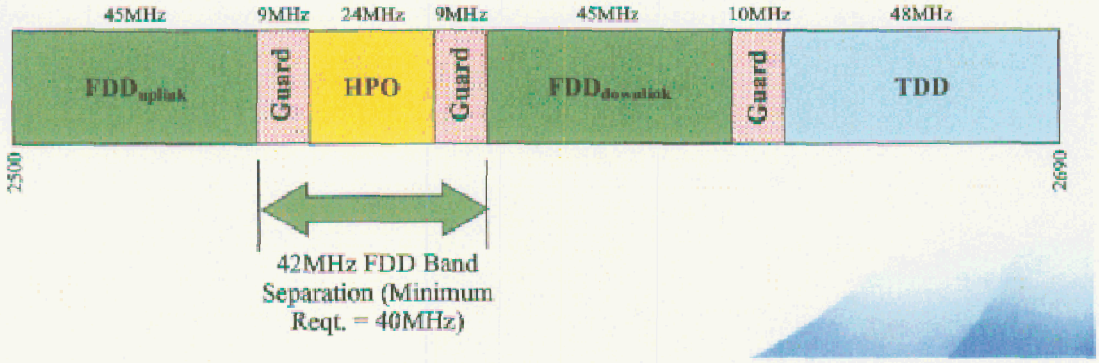
☆ May be acceptable to the FCC

Analysis of 2.5 GHz Band Plan Proposals

Nokia Proposal to WCA TRRG

Nokia Bandplan – Recommended Approach 1
(4 Channels Needed for Supercell Operation)

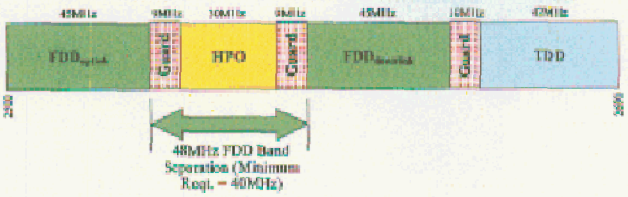
- Nokia's Recommended Bandplan 1:
  - 45+45 MHz (90MHz) of FDD cellular operations
  - 24 MHz of HPO at the Supercell
  - 48 MHz of TDD cellular operations
  - 28 MHz of guardband



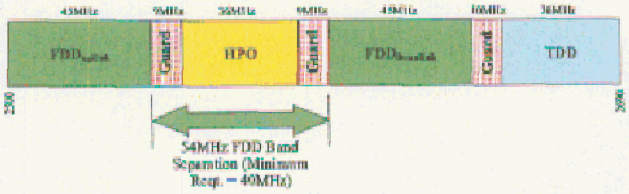
NOKIA

Nokia Bandplan – Recommended Approaches 2a,2b,2c
(5-7 Channels Needed for Supercell Operation)

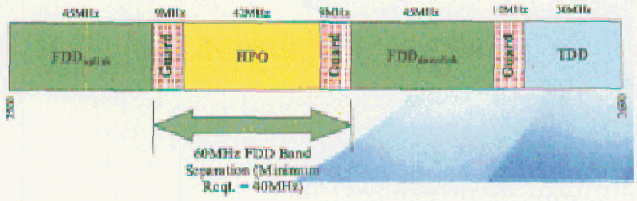
- Nokia's Recommended Bandplan 2a (5 channels for Supercells):
  - 45+45 MHz (90MHz) of FDD
  - 30 MHz of HPO at the Supercell
  - 42 MHz of TDD
  - 28 MHz of guardband



- Nokia's Recommended Bandplan 2b (6 channels for Supercells):
  - 45+45 MHz (90MHz) of FDD
  - 36 MHz of HPO at the Supercell
  - 36 MHz of TDD
  - 28 MHz of guardband



- Nokia's Recommended Bandplan 2c (7 channels for Supercells):
  - 45+45 MHz (90MHz) of FDD
  - 42 MHz of HPO at the Supercell
  - 30 MHz of TDD
  - 28 MHz of guardband



NOKIA

Analysis of 2.5 GHz Band Plan Proposals

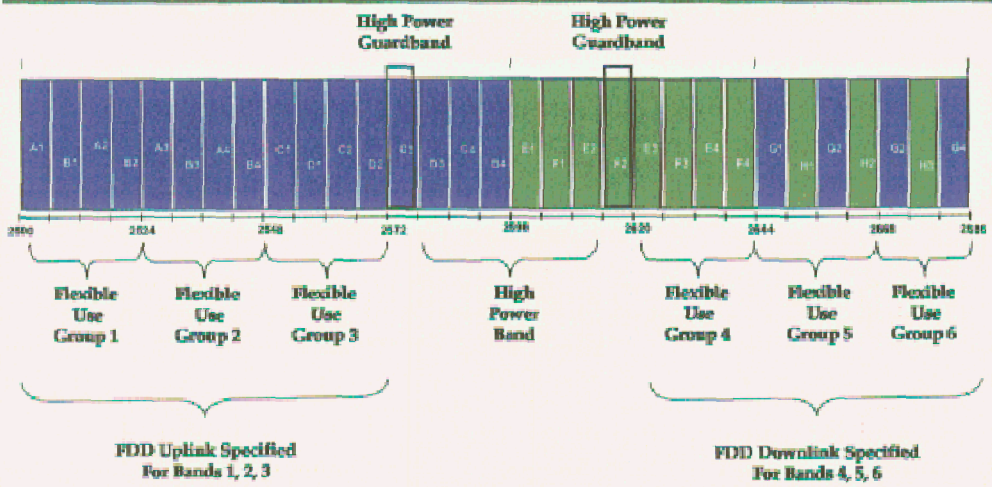
Assessment of Nokia Proposal

+ Provides paired spectrum suitable for FDD systems
+ Provides some spectrum for TDD
+ Coexistence problems eliminated by segregating FDD and TDD allocations
+ Little spectrum wasted in guard bands
+ May be acceptable in Europe
- Bands designated in advance for either TDD or FDD systems => neither flexible nor market-driven
☹ Proscribing technology choice non-starter at FCC

Analysis of 2.5 GHz Band Plan Proposals

Clearwire Proposal to WCA TRRG

Clearwire Suggested Band Plan Discussion Draft 7/19/02



CLEARWIRE

Band Plan Features

- Flexible Use groups can be used for either TDD or FDD, but lower Flexible Use band would be specified by rule as uplink only (and upper band as downlink only) to the extent it is used for FDD
  - Creates uniformity and predictability for FDD vendors
- Band plan creates three natural "pairs" of FDD channel groups, 1 and 4; 2 and 5; 3 and 6, with uniform spacing (19 channels x 6 MHz) between the "front edges" of the pairs (i.e. A1-E3; A3-G1; C1-G3).
  - This leverages similar spacing in current PCS bands and filters/separation used in mobile FDD handsets
- If operations in contiguous groups (e.g. groups 1 and 2) are commenced which require guardband, each operator/licensee must "supply" half of rule specified guardband at the group border
- Market forces are permitted to drive selection of TDD or FDD by individual operators, and allows for the evolution of use over time as FDD equipment becomes available and mobile uses are supported

CLEARWIRE

Band Plan Features (continued)

- *Licensee transition issues*
  - MDS/ITFS licensees should have the option to take four contiguous flexible use channels rather than three plus a High Power channel, since individual licensees may not plan to use High power Channels
  - Any "extra" High Power channels can be provided to licensees desiring a greater number of High Power channels (e.g. ITFS licensees with multiple video channels)
  - If High Power channels remain unclaimed, such channels can be repurposed for unpaired flexible use
- Mechanics of licensee transition TBD by GRC

CLEARWIRE

Analysis of 2.5 GHz Band Plan Proposals

Assessment of Clearwire Proposal

+ Provides paired spectrum suitable for FDD systems
+ Provides spectrum for either TDD or FDD systems
+ Coexistence problems reduced by creating blocks of "FDD-only" bands and "TDD-only" bands
+ Less spectrum wasted in guard bands
- Less "chaotic" than the WCA proposal, though may have too much flexibility for Europe and other markets
• Technology choice is market-driven, but for blocks of channels only
☆ May be acceptable to the FCC

Analysis of 2.5 GHz Band Plan Proposals

"Flexibility with Order" Proposal

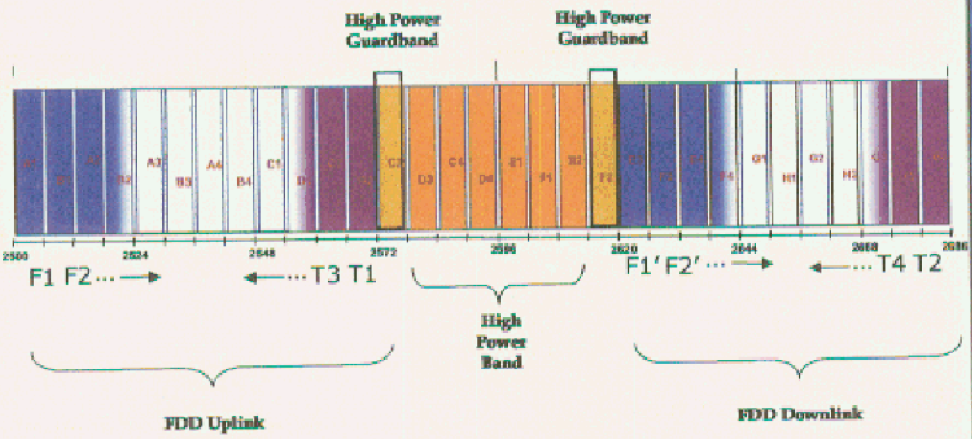
Analysis of 2.5 GHz Band Plan Proposals

Elements of a "Flexibility with Order" Proposal

- **Maintain the same band plan and technical rules proposed by the WCA**
- **Maintain flexibility in use of bands for either TDD or FDD systems**
- **Avoid coexistence problems by allowing each operator's system choice guide the assignment of their specific spectrum license**
- **Establish a set of rules for how licenses are assigned in each market:**
  - Assign FDD licenses from the bottom of the band upward
  - Assign TDD licenses from the top of the band downward
- **TDD-FDD systems appear in adjacent bands when all of the spectrum licenses have been assigned. Otherwise, defacto guard bands separate systems.**

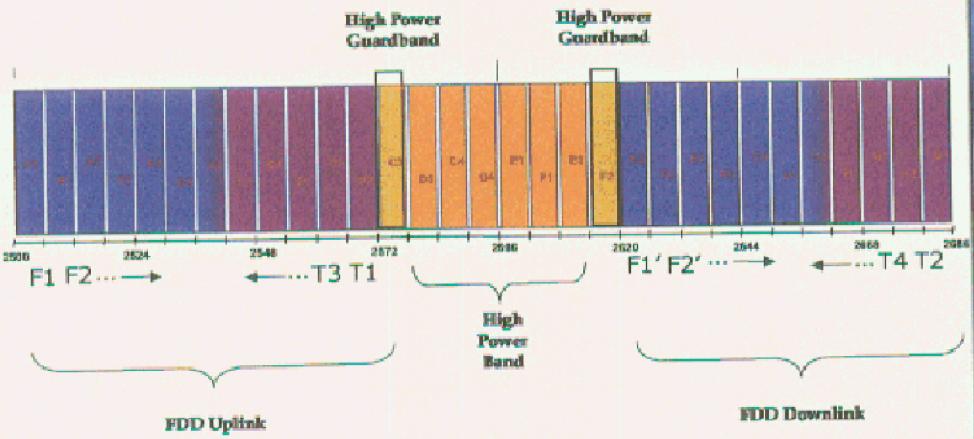
Analysis of 2.5 GHz Band Plan Proposals

The "Flexibility with Order" Proposal



Analysis of 2.5 GHz Band Plan Proposals

The "Flexibility with Order" Proposal



Analysis of 2.5 GHz Band Plan Proposals

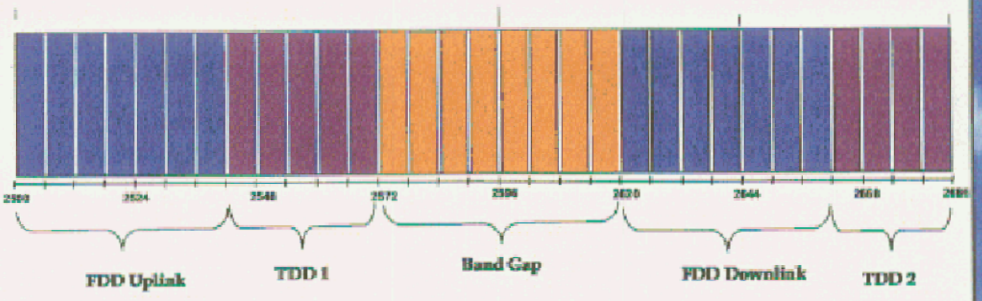
Assessment of "Flexibility with Order" Proposal

+ Provides paired spectrum suitable for FDD systems
+ Provides spectrum for either TDD or FDD systems
+ Technology choice is market-driven
+ Coexistence challenges are avoided by assigning spectrum licenses in an orderly way that voids placing TDD and FDD systems in adjacent bands
+ Little spectrum wasted in internal guard bands
+ Compatible with a version acceptable in the European market

☆ May be acceptable to the FCC

Analysis of 2.5 GHz Band Plan Proposals

European version of "Flexibility with Order" Proposal



Analysis of 2.5 GHz Band Plan Proposals

Conclusions

- **It is possible to have a 2.5 GHz 3G band plan that is harmonized between the US and Europe**
- **The WCA Proposal won't sell outside of the US**
- **The "*Flexibility with Order*" proposal provides**
  - Flexibility for market-driven technology choice
  - Minimum coexistence problems
  - Spectrum suitable FDD and TDD systems
  - Spectrum for High Powered Broadcast applications
  - Reuse of technical aspects of the WCA proposal
- **The "*Flexibility with Order*" proposal can be harmonized with a band plan that is acceptable in Europe**
- **Wireless industry should "seize the day" to harmonize US and European markets in the 2.5 GHz band**

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